

number>, and the cited pages are pages 5-11 of chapter 30, so the proper citation is "pages 30-5 through 30-11", as appears at page 4, line 26.

The Leverenz reference

Copies of chapters 17 and 30 of the reference are attached to this Office action.

Patentability of claims 112-131

The claims

The following discussion of these claims is from Applicants' *Appeal Brief*. Claims 112-131 were added to the application in an amendment filed 3/12/2002. Claims 112-118 are addressed to "Apparatus for responding to a request"; claims 119-123 are addressed to "A method of responding to a request; claim 124 is a Beauregard claim which incorporates the method steps of claim 119; claims 125-127 are directed to "Apparatus for caching copies of objects belonging to a subset of the objects belonging to a first database system; claims 128-130 are directed to "A method of responding to a request" whose steps are performed in a context like that provided by the invention of claim 125; claim 131, finally, is a Beauregard claim which incorporates the method steps of claim 128.

Claims 112-131 address the system disclosed in the patent application under appeal as "a distributed database system that includes a plurality of database systems" (claim 112, lines 2-3) and as "apparatus for caching copies of objects" from a first database system in a second database system (claim 125, lines 1-5). In the following, a summary of claims 112-131 will be presented; the issue of whether claims 112-131 are supported by the specification as filed will be discussed in the section *Argument* below.

Claims 112-124

Claims 112-124 are sufficiently closely related that a detailed summary of apparatus claims 112-118 should suffice for all of them. Claim 112 reads as follows:

112. Apparatus for responding to a request, the request including one or more specifiers referring to objects belonging to a plurality thereof in a

distributed database system that includes a plurality of database systems and the apparatus comprising:
a first database system of the plurality; and
a redirector which responds to the request when the request includes a specifier that cannot be interpreted in the first database system by causing the request to be executed at least in part in a second database system of the plurality, the request otherwise being executed in the first database system.

Beginning with the preamble, the preamble contains the terms "request", "specifiers", "objects", "distributed database system". FIG. 2 shows the "distributed database system that includes a plurality of database systems" disclosed in the patent application; it is embodied in a cache database system 347 in each of the servers 203 and a source database system 241 in source database server 237. The "objects" in the distributed database system are embodied in database objects such as database tables (see page 8, line 23 of Applicants' Specification). The "request" is embodied in the OLE-DB, ODBC, or JOBC queries which data access layer 253 received from Web application 111, as explained at page 2, lines 16-24; the "identifiers" are embodied in the portions of the queries that identify database objects such as the tables.

Continuing with the body of the claim, the "first database system" is embodied in cache database 347; the "second database system" is embodied in source database 241. The "redirector" is embodied in DA interface 304 and query dispatcher 351. The behavior of the redirector set forth in lines 6-9 of claim 112 is described at page 12, line 15 through page 13, line 30.

Continuing with claim 113, the added limitation is embodied in the fact that cache database 347 contains copies of objects from source database 241. Claim 114 expressly sets forth the limitation that the database system embodied in cache database 347 is a cache. Claims 115 and 116 address the relationship between cache database 347 and source database 237 embodied in system 201. Claims 117 and 118 are addressed to embodiments like system 201 in which the "Apparatus for responding to a request" is local to a Web server of the type shown at 107 in FIG. 1. Method claims 119-123 are

different in scope from apparatus claims 112-118, but are embodied in the same features and behavior of system 201, as is Beauregard claim 124, which is based upon method claim 119.

Claims 125-131

These claims are also sufficiently closely related that a detailed summary of claims 125-127 should suffice for all of them. Claim 125 reads as follows:

125. Apparatus for caching copies of objects belonging to a subset of the objects belonging to a first database system that returns an object in response to a request therefor, the request including one or more specifiers referring to the objects and the apparatus comprising:
a second database system that contains the copies; and
a redirector that responds to the request when the request includes a specifier that cannot be interpreted in the second database system by causing the request to be executed at least in part in the first database system, the request otherwise being executed in the second database system.

Beginning with the preamble, the "first database system" is embodied in source database 241; "objects" are embodied as explained above with regard to claim 112, as are "requests" and "specifiers referring to the objects". The "second database system" is embodied in cache database 347 and the redirector is embodied in query dispatcher 351 and DA interface 304, as explained in the discussion of claim 112 above. Claims 126 and 127 are embodied as described for claims 122 and 123 above. Method claims 128-130 have different scopes from apparatus claims 125-127, but are embodied in the same features and behavior of system 201, as is claim 131, which is a Beauregard claim based on method claim 128.

The references

Of the references cited thus far in this prosecution either by Examiner or Applicants, the ones which Applicants believe to be relevant to the patentability of claims 112-131 are U.S. Patent 5,924,096, Draper, et al., *Distributed database using indexes into tags . . .*, filed 10/15/97, henceforth Draper, which has been applied by both Examiners in this prosecution, *IBM Cache Manager*, found on 3/9/99 at

<http://www.storage.ibm.com/hardsoft/products/wcm/webcache.htm> (henceforth "IBM") and included in the IDS filed 5/18/99 in the application, which was discussed by Applicants in their response of 10/20/00, the Leverenz reference, and Dar, et al., "Semantic data caching and replacement", *Proceedings of the 22nd VLDB Conference*, India, 1996 (henceforth "Dar"), provided by Applicants in the IDS filed 8/4/2004. Applicants are citing the Durbin reference in this response. These references fall into two groups:

- Those dealing with caches, which includes Draper, IBM, and Dar; and
- Those dealing with distributed database systems, which includes Leverenz and Durbin.

The references that deal with caches

The IBM reference

The IBM reference describes a cache of Web pages; the Web pages are accessed by URL, not by queries, and the cache is thus not a database system as that term is used in Applicants' claims.

Draper

Draper is primarily concerned with keeping caches consistent with their source databases. He states at col. 5, lines 9-10 that the data items "may be organized in a hierarchical database, a relational database, or another organization" and at col. 8, lines 14-22 that the cached data and the master data may have different database formats. He also indicates at col. 13, lines 51-55 that his caches may fetch a data item on miss. His exemplary embodiment, described at col. 9, lines 33-53, is a system for publishing documents on the Web. The data items stored in the master system are documents in various file formats. When the publishing system publishes a document, it converts the document into an HTML format and sends the document to the cache. In the cache, the document is of course accessible by URL, and not by a query. Even if the cache in Draper can be taken to be a database system, there is absolutely no disclosure in Draper concerning how data is located in the cache or what happens in the cache when a miss occurs. It is of course exactly that which is the subject matter of Applicants' claims 112-131.

Dar

Section 1.2 of Dar nicely describes the problem that the invention of claims 112-131 solves in Section 1.2 and then proposes a partial solution to it which does not require that the cache include a database system. The solution is described in overview in Section 2.4 of the paper. The client cache is managed as a set of *semantic regions*. Each semantic region is associated with a constraint formula and contains tuples that satisfy the constraint. When a user query is made on the client, it is split into two pieces, a *probe* query which retrieves the tuples available in the cache and a *remainder* query, which retrieves the tuples specified in the user query that do not satisfy the constraint formula from the server that contains them. Here, too, the cache is not a database system as that term is used in Applicants' claims.

The references that deal with distributed database systems

The Leverenz and Durbin references describe features of the Oracle8 database system as it existed in 1997. Chapter 30 of the Leverenz reference describes *replication*, which is defined at page 30-2 as "the process of copying and maintaining database objects in multiple databases that make up a distributed database system." The replicated database systems described in Leverenz are distinguished from Applicants' claimed "first database system" by the fact that that the replicated database systems have no redirectors; if the request includes a specifier that cannot be interpreted in the replicated database system, the request is not redirected to another database system, but simply fails.

The Durbin reference describes *database links* in Oracle8 distributed database systems. As stated at page 1-5 of the reference, "a database link defines a one-way communication path from an Oracle database to another database." To use a database link to reference data on the other database, one employs the *global object name* for the data, as set forth at page 1-6. For example, if the link is to another database that has the global name `sales.us.americas.acme_auto.com`, the table `scott.emp` in that database can be referenced in a query run on the first database like this:

```
SELECT * FROM scott.emp@sales.us.americas.acme_auto.com
```

This kind of reference to a remote database system is distinguished from what Applicants' redirector does by the fact that in this case, the reference to the remote database system does not occur because the first database system cannot interpret the request, but rather because the first database system can interpret it by following the link specified in the request. Put another way, *because* there is a link in the first database system, the reference cannot result in a miss in the first database system.

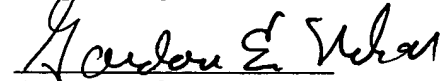
Patentability of the claims over the references

As is apparent from the foregoing, the references neither describe what Applicants are claiming in claim 112 when taken singly nor describe it when taken in combination. Consequently, the references do not provide a foundation for a rejection of claim 112 either under 35 U.S.C. 102 or under 35 U.S.C. 103. As Examiner will immediately see, the arguments that apply to claim 112 apply equally to the other independent claims 119, 124, 125, 128, and 131.

Conclusion

Applicants have included a copy of the Leverenz reference with this response, have demonstrated that the page numbers at page 4, line 26 do not require correction, and have demonstrated that their claims are patentable over the references that have been applied thus far in the prosecution by either Examiner or Applicants' attorney. Applicants are further including an IDS for the Durbin reference along with the requisite petition and fee. Applicants have thus been fully responsive to Examiner's Office action of 10/1/04 as required by 37 C.F.R. 1.111(b) and respectfully request that Examiner continue with her examination, as provided by 37 C.F.R. 1.111(a).

Respectfully submitted,



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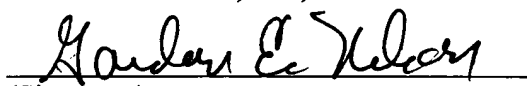
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